Installation Guide

Control System

A better approach to radiant Heating systems

Radiant Heating and Snowmelting products

ComfortPro® Systems

AquaHeat

System Design and Installation

The Mains

PEX pipe mains are recommended to reduce labor and architectural impact. For a slab-on-grade installation, the mains can be buried below or within the slab. For below slab installation refer to insulated supply and returns like ComfortPro Systems Microflex product range. For a wet or dry on plywood application, the mains can be installed within the joist cavity. Always allow for the expansion and contraction of the mains, as the temperature fluctuates. It is recommended that the pipe be allowed free movement and is not fastened directly to the floor joists.

Requirements of a hydronic control system

The intent of a hydronic heating control system is to achieve heating comfort, system protection, energy saving and ease of use.

Heating comfort is achieved by:
- keeping proper system temperatures
- directing the right amount of heat when and where you want it

System protection is achieved by:
- protecting the primary heat source (e.g. boiler) from corrosion and thermal shock
- reducing equipment cycling

Energy saving is achieved by:
- running the system at the lowest water temperature possible
- turning off the system when no heat is demanded
- minimizing boiler short cycling.

Ease of use is achieved by:
- running automatic functions in lieu of manual settings
- providing easy and consistent wiring and installation procedures

AquaHeat Installation Guide Philosophy

A hydronic system can get quiet complicated and with the rapid introduction higher integrated solutions keeping up is challenging more than ever. To keep the basic installation order we have build this guide to reflect the typical steps in the implementation of a project:

Chapter 1 - Hydronic floor installation

Chapter 2 - Manifold installations

Chapter 3 - Boiler room installations

Chapter 4 - Control system installation

Chapter 5 - System start-up, warranty requirements and maintenance

Chapter 4 - AquaHeat Control System

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AquaHeat ProZone Control Systems

AquaHeat ProZone control systems come in various scalable building blocks which makes the systems suitable for every application.

System Components are grouped into
- Actuators
- Control Box
- Timer Box
- Thermostats
- Sensors

The ComfortPro AquaHeat ProZone control system allows for various combinations of these individual components to fit budget, size, and user convenience.

AquaHeat ProZone Control System components

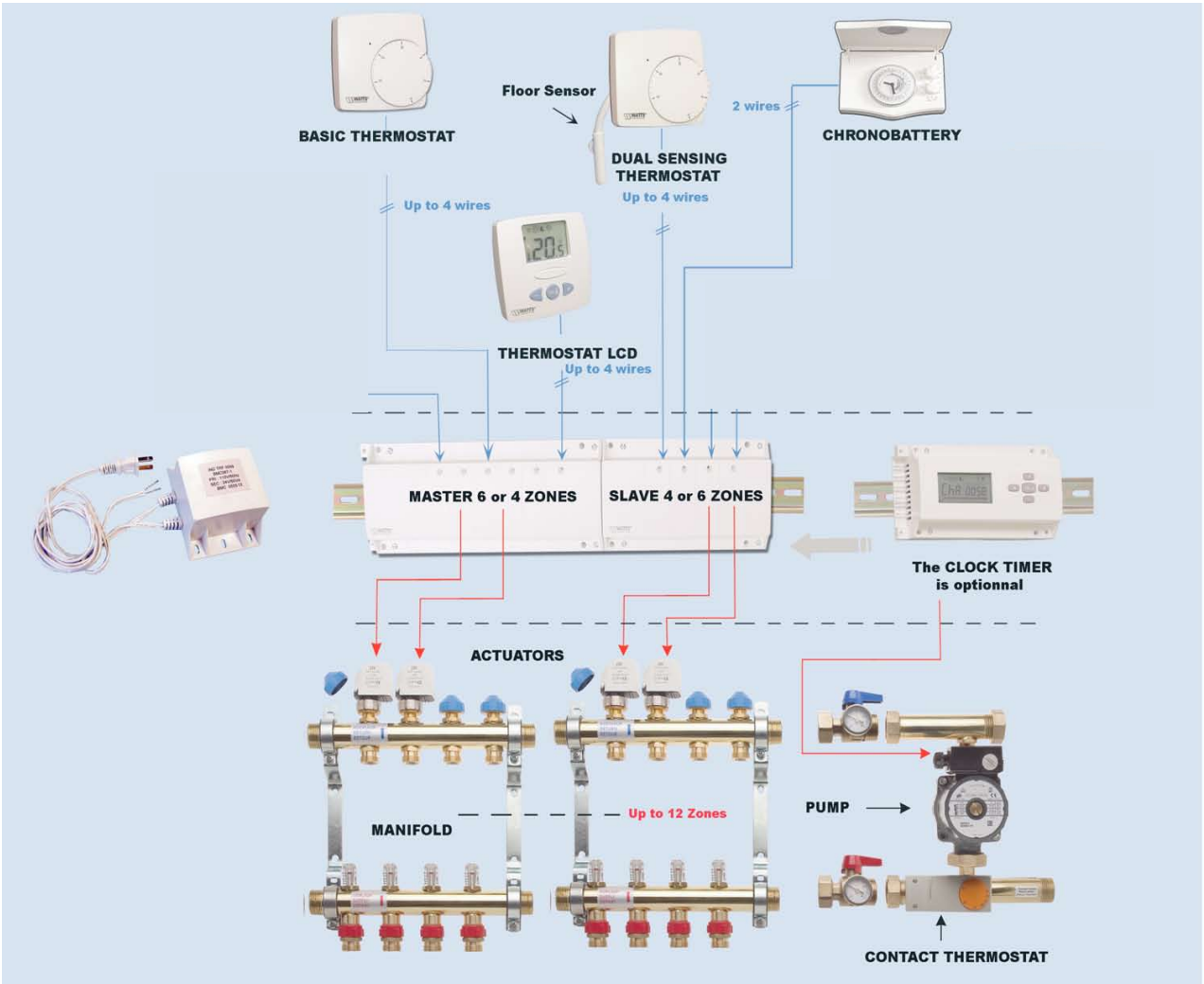


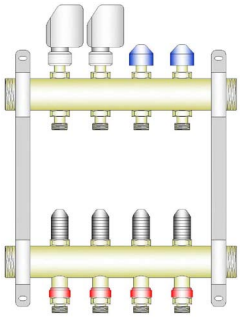
Fig 1 - AquaHeat System Components

Zone Definition

A Heating Zone is defined as an individual or grouped section of the whole heating system, which is controlled at once.
In the simplest case a zone is characterized by a single floor loop of PEX pipe connected to a manifold. A Zone can also comprise of several floor heating loops connected to a manifold and controlled by a single controller/thermostat. Ultimately, a Zone can comprise of a complete manifold which is controlled by a single zone valve in front of the manifold injection loop.

Manifolds are typically operated by electro-mechanical servo motors to open and close individual floor loops water circulation at the supply side loop valves which in turn are controlled through the ProZone control box and/or directly through thermostats.

Loop actuators can be connected as single or individual zones



Single loop actuator to control a whole manifold

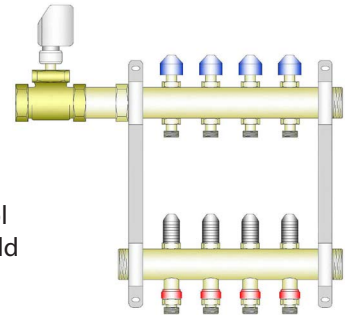


Fig 2 - Zone Definitions

Recommended Control System per Loop count

The ProZone heating control system can be scaled for every project. Key indicator for the requirements of a floor heating system is the number of PEX pipe floor heating loops used in the project.
Examples are:

1. Simple, one zone system

A very basic system comprises of a manifold like the AquaHeat ProMix or ProLock manifold with one or more floor PEX pipe loops combined to a single zone. In this case, the floor heating system can be controlled by a single thermostat like AquaHeat Pro Basic thermostat. One actuator is controlled by the thermostat and regulates the flow of heat into the manifold loops through a zone valve in front of the manifold supply line.

2. Multiple Zone System

For a multiple zone system each zone is controlled by a thermostat and/or a ProZone control box. In this case, the actuators mounted to the manifold are grouped to its individual zone and typically connected to a ProZone control box. The ProZone control box allows for a clean installation without extensive wiring. The control box connects again the Zone to the individual thermostat.

3. Multiple Zone system with multiple manifolds and timer control

In larger projects it is often required to use several manifolds for many floor loops. The following considerations should be observed:
If more than one manifold is used (based on large living area coverage or higher than usual zone division) group manifolds according to controlled zones. Make sure that control box and actuators receive enough power to support the operation (i.e. size the supply power transformer accordingly).

Radiant Heating Floor Loops								
		Part #	1 - 3	4	6	10	12	18
Pro Thermostats	ProBasic	450008	●	●	●	●	●	●
	Pro Basic Dual Sensor	450009	×	×	×	×	×	×
	Pro Digital Dual Sensor	450010	×	×	×	×	×	×
	Pro Chronotherm	450011	×	×	×	×	×	×
ProZone Control Box	Pro 4 Zone Master	450003		●		×		
	Pro 6 Zone Master	450004			●	●	●	●
	Pro 4 Zone Slave	450005				●		
	Pro 6 Zone Slave	450006				×	●	●
	Pro Clock Timer	450007		×	×	●	●	●
Pro Zone Power Supply	Pro Zone Transformer (60 VA)	450014	●	●	●	●	●	●

● Required/recommended components

× Alternative components

Table 1 - Control System Recommendation per Floor loop count

Step - by - step Installation at a glance

1. Mount all components of the system, i.e. Control Boxes, Transformer, Timer boxes, thermostats, actuators, external sensors
2. Connect the actuators to the control box or in a simple case to the thermostats directly
3. Connect the thermostats and sensors
4. Connect the pump power cable to the Master control module
5. Connect the transformer to either thermostat or AquaHeat ProZone master control box
6. After completed electrical wiring power-up the system
7. Check whether all zones are opening the actuators and the injection loop starts pumping
8. Program the ProZone Timer Box (if available) for desired duty cycles and night reduction.
9. Set thermostats minimum and maximum temperature range
10. Calibrate thermostats for exact temperature

General Installation Guidelines

These step - by - step instructions explain the full installation for the ProZone Control System. Before an installation can occur the following general guidelines and pre-requisites have to be maintained:

Wiring

Wiring of the system is divided into two groups of wires needed for the operation of the system. ComfortPro recommends using the following minimum wire diameters as defined by the American Wire Guide (AWG):

Thermostat wiring

Thermostat	AWG	Diameter
Pro Basic (2 wire)	24	0.0201"
Pro Basic (4 wire)	18	0.0403"
Pro Digital (2 wire)	24	0.0201"
Pro Digital (4 wire)	18	0.0403"
Pro Chronotherm	15	0.0571"

Table 2 - Wire Sizes

Actuator Wiring

AquaHeat ProZone actuators come with a 3ft pre-sealed 2-pole cable. If the length of the cable needs to be extended use AWG size 18 or better 17 type wiring.

Control Box Power supply

For power line wiring the usual AWG sizes should be used. If the low voltage side after the transformer has to be extended to reach the Control Box or thermostat, caution should be taken to use a strong copper cable in order to minimize power loss along a longer wire.

Component Locations

All system components should be installed in the most reasonable distance to their connected modules. Caution should be taken in small spaces so that the system components (like power transformers) are not overheating.

Control Boxes and Pro Clock Timer should be mounted on a DIN rail above the Manifold within 1-3ft of the manifold. There should be a power outlet to the left side of the DIN rail for most convenient installation. We recommend the thermostat wiring sparing on top of the DIN rail. If a manifold cabinet is used it is recommended to size the cabinet with respect to the Control boxes size.

Maximum DIN rail length or wall space used is approx. 25 inches.

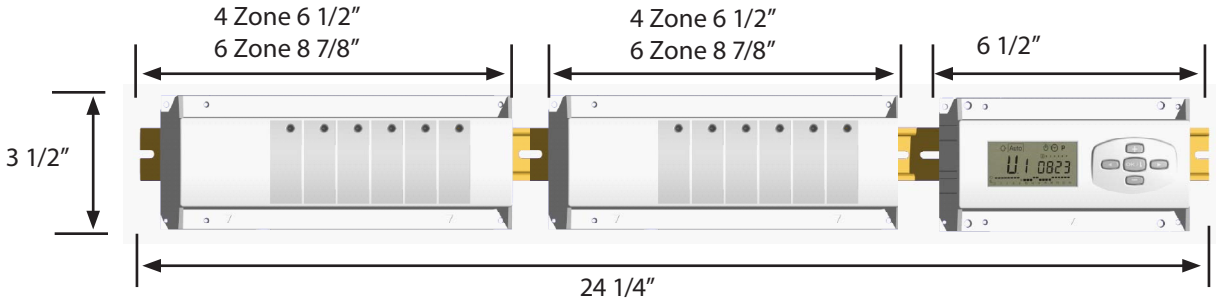


Fig 3 - ProZone Module Dimensions

Pro Series Thermostat Installation Locations

When installing thermostats in a new development the following aspects have to be taken in consideration.

Select the location of the thermostat conveniently for the user
Install thermostat on the inside walls of the building/dwelling
Install thermostat minimum 8 inches away from doors.
Thermostats should be mounted approximately 54 - 60 inches from the floor

Note: Avoid mounting thermostats close to windows, on outside walls, behind doors, close to the floor or ceiling and other cooling or heating devices

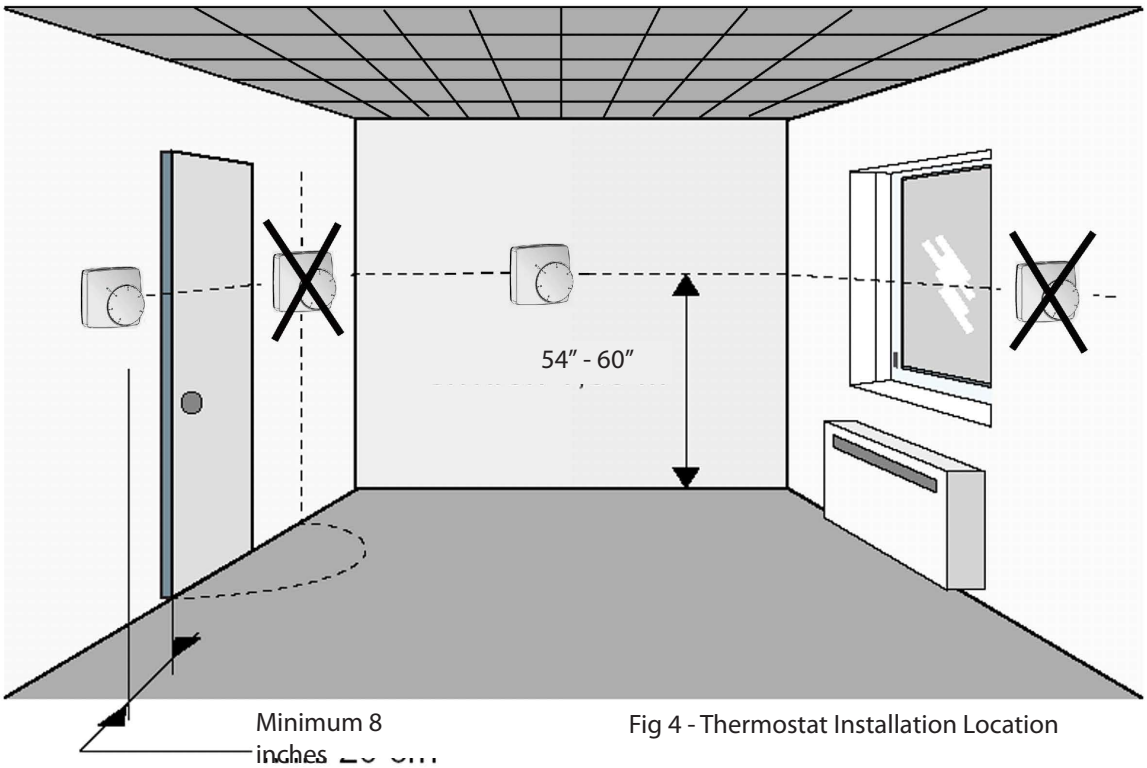
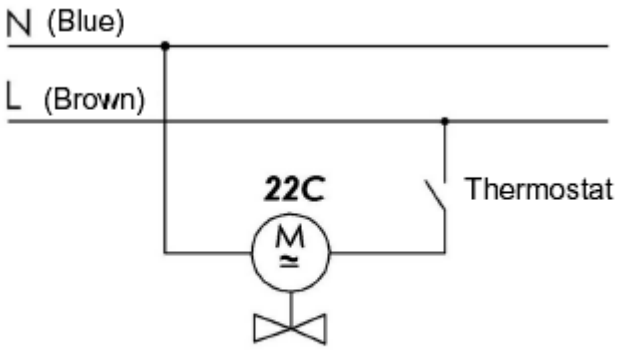


Fig 4 - Thermostat Installation Location

AquaHeat Actuators (P/N 450001, 2 - wire) or (P/N 450002, 4 - wire)

AquaHeat offers two kind of actuators for Promix and ProLock manifolds. AquaHeat actuators operate on 24VAC supply voltage and can be controlled through the ProZone Control Box or directly through the thermostat. Actuators come as 2 and 4 wire models. 4 wire models include an additional end switch (black and grey cable) which can be used to control a pump. AquaHeat offers both models to give optimal system versatility to the systems design.

Wiring Diagram - 2-wire



Wiring Diagram - 4-wire

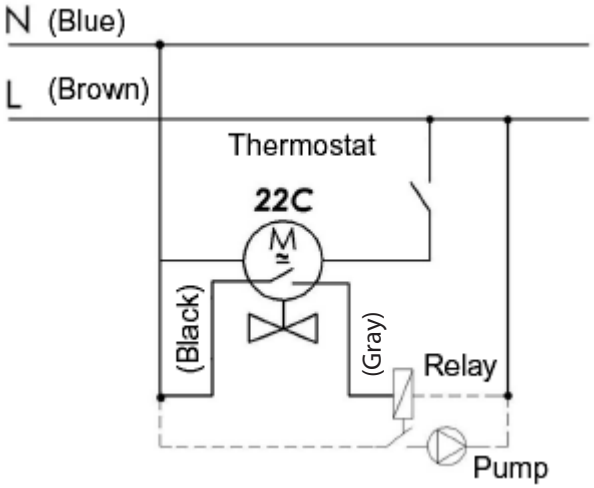


Fig 5 - Actuator wiring diagrams

NC Actuators (Normally Closed)

AquaHeat actuators are operated as normally closed (NC) versions, i.e. during normal or stand-by operation the manifold loop supply valve is closed and no water is pumped throught the loop. Upon request from either the ProZone Control box or the thermostat the actuator drives open the manifold loop supply valve and fresh heating water is pumped through the floor loop. When the room temperature in the room or floor reaches the desired target temperature the thermostat or ProZone Control Box closes the loop supply valve through the drive of the actuator into the NC position.

ProMix Manifold actuators
Actuator Operation

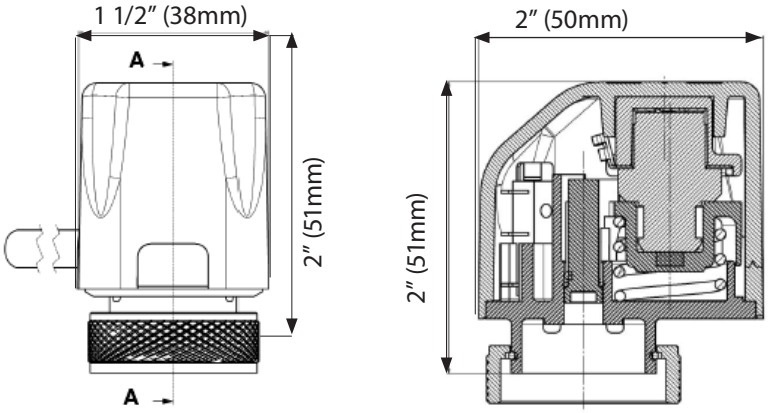


Fig 6 - ProZone Actuator Dimensions

When the thermostatic element expands, it supplies the thrust required for automatic movement of the valve. The 4-wire version is provided with an auxiliary contact for additional commands (metering, control of pump, fan or other equipment). The actuator has a transparent window that allows to check the status of the actuator on the actuator cover.

Mechanical Installation of the ProZone Actuator

Transparent Zone	Valve
Red	Closed
Black	Open

Fig 7 - Actuator Indicator

1. Remove handle or cap from the body valve.
2. Position the actuator and tighten the ring nut of the actuator manually onto the body valve.
   Do NOT use pipe wrenches, spanners or similar.
3. Connect electrical wiring.

Fig 8 - ProZone Actuator Mount

Important maintenance notes
Do not replace the connected cable. Opening the ProZone actuator will cause irreparable damage to the device.
Faulty actuators must be replaced as complete units.

Warning
The actuator must not be installed below the body valve.

Technical Characteristics

Action Open/Close
Power supply 24 VAC (+10% / -15%)
Frequency 60 Hz
Power consumption (normal operation) 2.5 VA
Peak starting current 0.35 A x 30 sec (24V)
Initial opening (NC) or closing (NA) time (power ON) 24V 3 min
Final opening (NC) or closing (NA) time (power ON) 5 min
Actuator stroke max 3.5 mm
Valve stroke 2.5 mm
Protection class IP44 to EN60529
Electrical Protection class II
Safety (contamination level) 2

Cable length 3ft
2-pole x 0.75 mm2
4-pole x 0.75 mm2
Operation temperature limit 32 - 122°F
Storage temperature limit -13 - 140°F
Fluid temperature limit Max 230°F
Nominal closing force (power OFF) (Closed type) 140 N (±10%)
Auxiliary microswitch (4-wire model) max 700 mA - 24Vac
Valve connection Threaded ring nut M30x1.5

Connecting the ProZone Actuator

Actuators can either be connected directly to thermostats in a single zone environment or for multiple zones we emphasize the use of the ProZone Master control box. By using a ProZone master control box one or more actuators are being connected to a single zone at the zone connector bench. Each Zone connector bench can connect up to 4 actuators, i.e. two cables per screw connector.

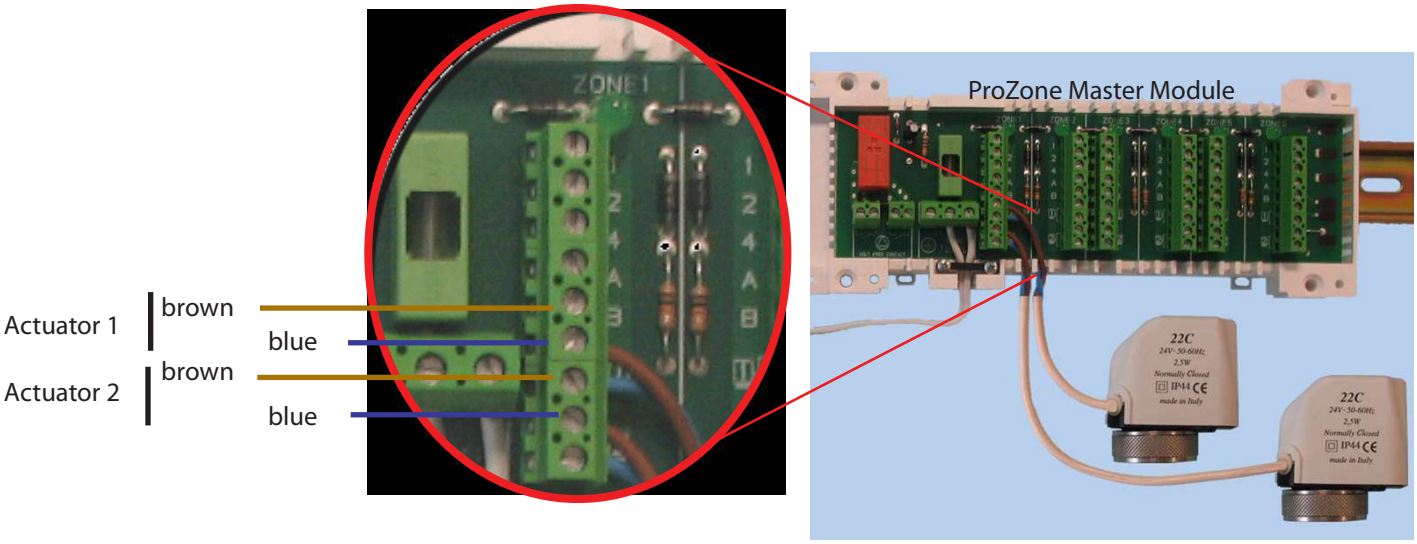


Fig 9 - ProZone Actuator Connection

Combining the Pro Zone Master/Slave/Timer Control Box

Before connecting the thermostats and actuators the control boxes have to be properly connected. The following combinations and positions mounted on a DIN-rail are possible. The units snap into each other after the Master cover is being removed.

Pro 6 Zone MASTER + Pro Clock TIMER

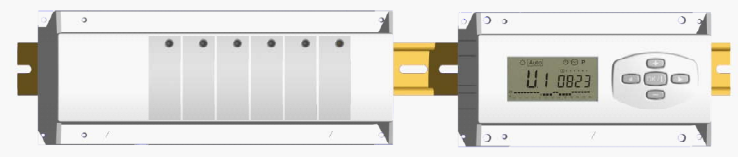
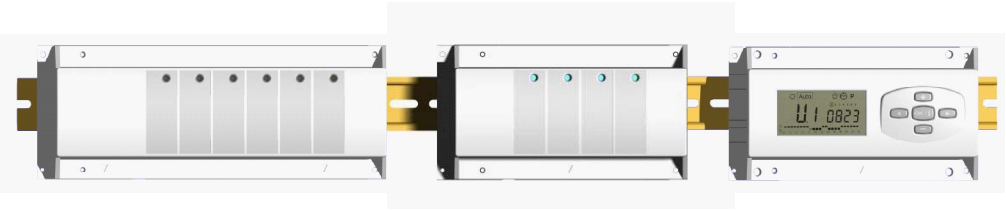
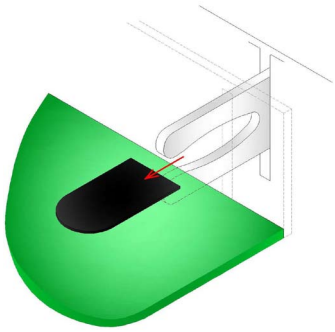


Fig 10 - ProZone Module combinations

Pro 6 Zone MASTER + Pro 4 Zone SLAVE + Pro Clock TIMER



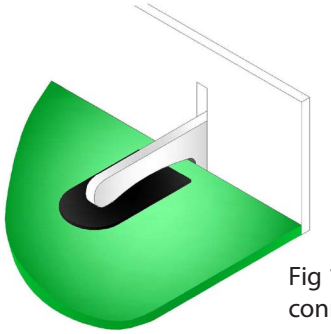
Pro 6 Zone MASTER + Pro 6 Zone SLAVE + Pro Clock TIMER



Quick Installation Instructions for ProZone Module assemblies

1. Open ProZone Master module cover by unscrewing three screws from the Master module cover front. Note that the fourth screw is delivered in a plastic bag within the package.

2. Slide the male connector clips from either the Slave or the Timer box sideways over the edge of the circuitboard. Note you can adjust the height of the male connector clamps by hand. See Fig 11.



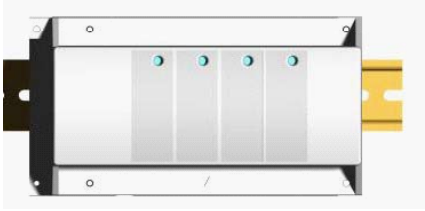
3. Clip into the DIN rail or use screws to screw housings directly to the drywall (4 screws /module)

Fig 11 - ProZone Module connectors

Pro 4 and 6 Zone Master with Pump Relay Box

ProZone Master modules are the essential modules for any sophisticated control system. A Master module provides power supply to multiple zones. On-board pump relay controls the circulator and or mixing pumps directly. Activity in one zone is indicated by a green LED diode. The master module conveniently allows to connect thermostats and actuators and assign zones to your projects. The Master Module comes as 4 (P/N 450003) and 6 Zone (P/N 450004) control box.

Pro 4 Zone Master



Pro 6 Zone Master

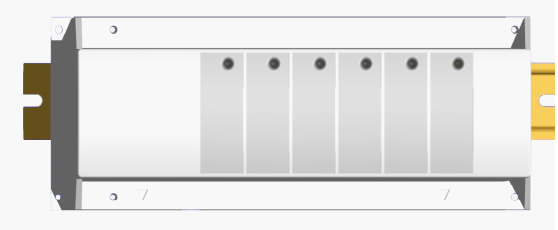


Fig 12 - ProZone Master Modules

Technical Characteristics

Operating temperature	32°F - 122°F
Circuit Protection	Class I - IP20
Power supply	24 VAC +/- 10%
Output	Pump & accessories: Relay => 2 free contact 8A 120Vac Zones: 4 or 6independent zones => the maximum output power of each zone depends on thermostat connecting on this zone. The maximum current for all connected actuators is 2.5A
LED Zone Indicator (green)	heating indicator shows water circulation

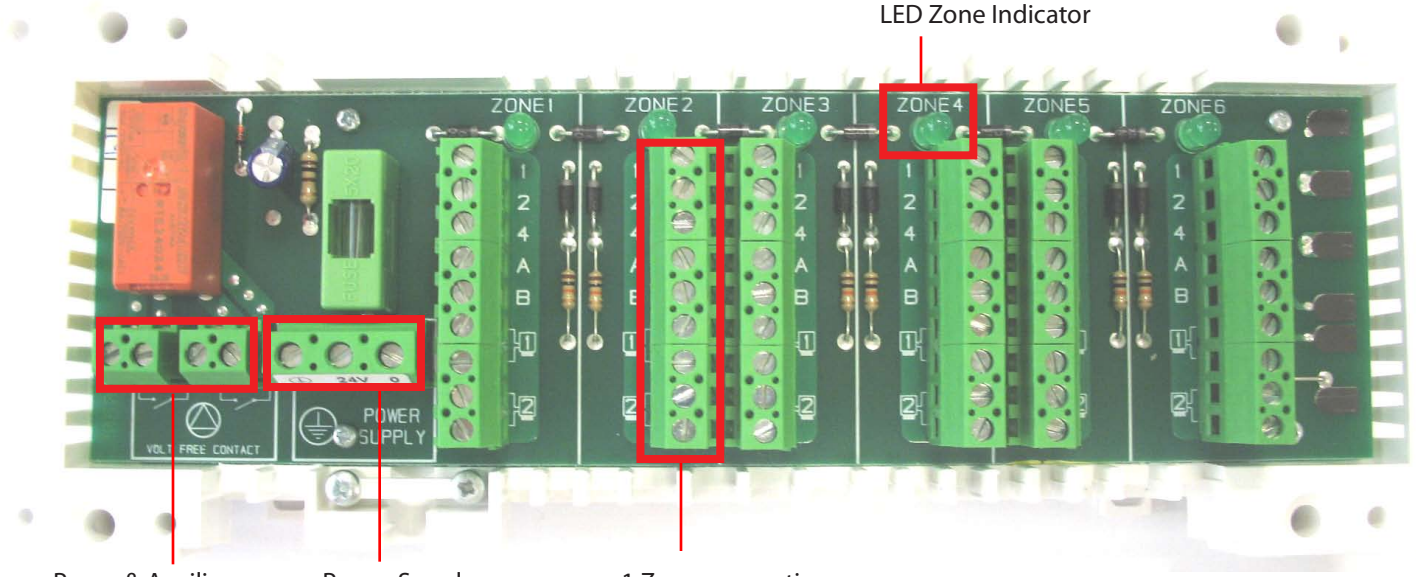
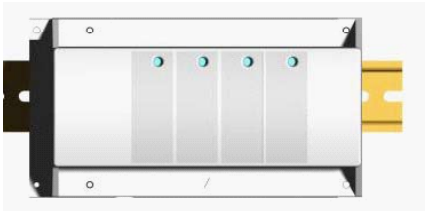


Fig 13 - ProZone Master Module PCB

Pro 4 and 6 Zone Slave Box

ProZone Slave modules allow for the Zone extension of the Master module functionality. The easy clip-in extender provides a fast and reliable connection to the Master module. Two extension modules (P/N 450005 - 4 Zone, P/N 450006 - 6 Zone) are available if additional thermostats and actuators are needed for the system design.

Pro 4 Zone Slave



Pro 6 Zone Slave

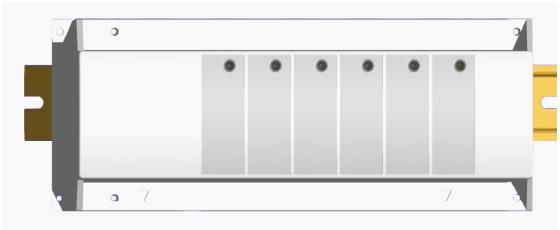


Fig 14 - ProZone Slave Module

Technical Characteristics

Operating temperature	32°F - 122°F
Protection	Clase I - IP20
Power supply	24 VAC +/- 10% 60Hz
Output	Zones: 4 or 6 independent zones => the maximum output power of each zone depends on the number of thermostats connecting to this zone. The maximum current for all connected actuators is 2.5A
LED Zone Indicator (green)	heating indicator shows water circulation

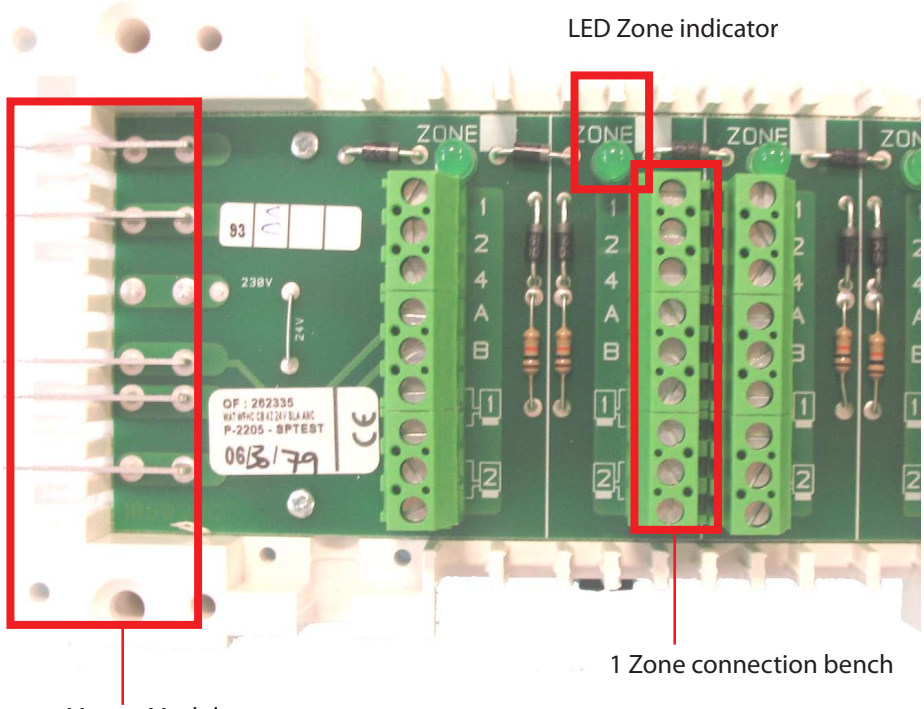
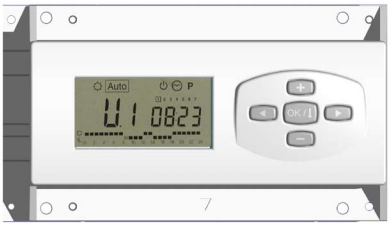


Fig 15 - ProZone Slave Module PCB

Pro Clock Timer Box

ProZone timer box (PN 450007) features 7 day programing, 2 channels A and B, 1 user program per channel, 9 built in programs, program graphics display, automatic or manual operation, key pad lock function for child safety, and in the event of a power outage hours and parameters are saved . The easy clip-in extender provides a fast and reliable connection to the Master or slave module.

Pro Clock Timer Box

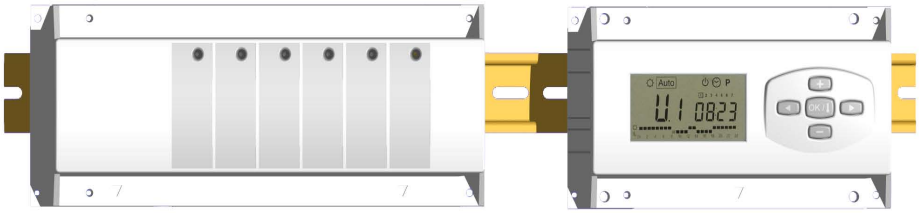


Technical Characteristics

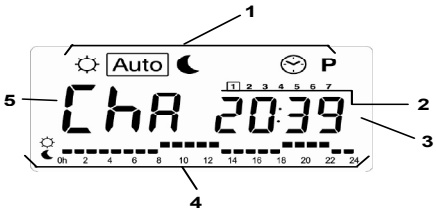
Operating temperature	32°F - 122°F
Protection	IP30
Power supply	24 VAC +/- 10% 60Hz

Master 4 or 6 zones

Timer box



Pro Clock Timer Display



1 : Operating mode menu
2 : Days of the week
3 : Time
4 : Program graphic
5 : Channel A or B

IMPORTANT:
in order to control Auto your thermostats with the TIMER please put your thermostat in position.

Mode description
Use the keys < & > in order to change the mode in the operating menu.

Set CLOCK Menu
Use this menu to adjust the Timer clock to the actual time.

Use < / > to adjust the minutes 0853 Press OK

Use < / > to adjust the hours 0823 Press OK

Use < / > to adjust the day 1 2 3 4 Press OK

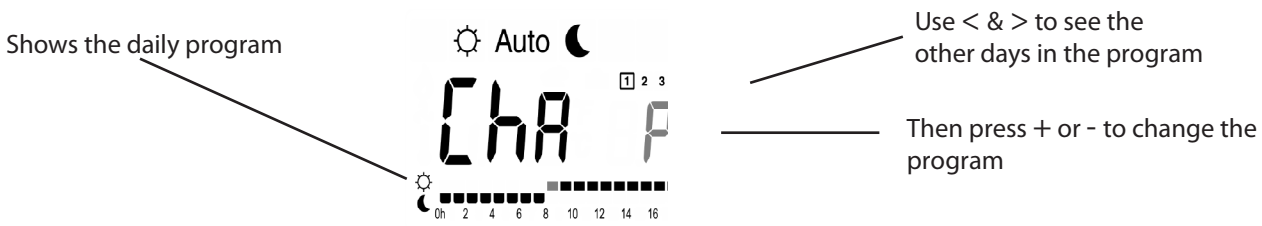
Manual REDUCED operating load
Force reduced temperature operation indefinately on the 2 channel.

Manual COMFORT operating load
Force comfort temperature operation indefinately on the 2 channel.

Auto Manual AUTOMATIC operating load
The timer follows automatically the selected program according to the actual time.

P PROGRAM MENU :

By pressing + or - keys you select the channel ChA or ChB to the program then validate with OK button.

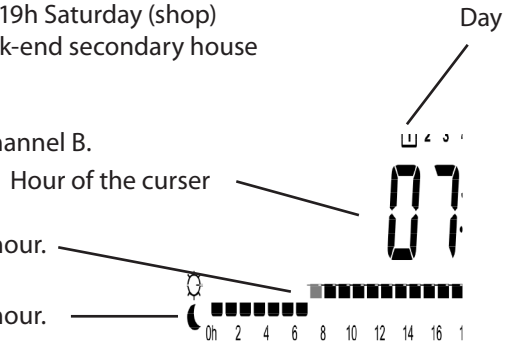

Shows the daily program
Auto
ChA
P
0h 2 4 6 8 10 12 14 16
Use < & > to see the other days in the program
Then press + or - to change the program

If you select a built -in program P1 to P9 and press OK this program will be followed in the Auto mode.

BUILT IN PROGRAMS DESCRIPTION

P1: Morning, evening week-end
P2: Morning, midday, evening, week-end
P3: Day & week-end
P4: Evening & week-end
P5: Morning, evening (bathroom)
P6: Morning, afternoon, week-end
P7: 7h - 19h (office)
P8: 8h - 19h Saturday (shop)
P9: Week-end secondary house

You can also select a user program U1 for channel A and U2 for channel B.



USER PROGRAM EDITION

The + key sets ☼ temperature at the current blinking program hour.

The - key sets ☾ temperature at the current blinking program hour.

Use the < & > keys to slide the blinking curser position in the day and modify or correct the program easily.

When the displayed day is correct press OK to save it and then you jump to the following day. When you press OK on day 7 you return to the top menu.

Now once automatic operating mode Auto is selected, the timer will look for the channels A and B the desired programs.

SPECIAL FUNCTION:

<u>KEYPAD LOCK function :</u>
Function to prevent any modifications or changes of the parameters.

In ☼ , Auto , ☾ , operating modes you should maintain the OK key pressed and simultaneously on the + or - key to (Loc codE) or unlock (Un Loc) the key pad.

Selecting Thermostats

ComfortProSystems offers a wide range of Thermostat solutions which will fit your design. In order to easily identify the combination of products for your complete Heating project please look at the following table (chpt 2-1)

Pro Basic (P/N 450008) and "Dual Sensing" (P/N 450009)

Thermostats contain a temperature dial which can be calibrated to reflect the correct room temperature. Pro Basic Stats can drive an actuator directly through the on-board quiet triac. The Dual Sensing Thermostat Part-Nr. 450009 picks up the room and floor temperature to correctly control the manifold flow.

Fig 16 - ProBasic Thermostat

Measured temperature precision	0.2°F
Operating temperature	32°F – 122°F (0°C - 50°C)
Setting temperature range	41°F - 86°F (5°C – 30°C)
Floor limiting temperature range	50°F - 104°F (10°C – 40°C)
Regulation characteristics	Proportional band 10min for 3.6°F or Static differential 0.9°F
Electrical Protection	Class II - IP30
Power Supply	24 VAC +/- 10%
Output	TRIAC output 24 VAC, 15 W max. (4 CPS ProZone actuators)
External Floor sensor	NTC (10K Ohms) 9ft
Soft version	V 1.4x

Pro Digital Dual Sensing (P/N 450010)

Pro Digital thermostats contain a display through which all interaction with the floor heating system is controlled. The functions are similar to Pro Basic thermostats and come with on-board sensor (part # 450010).

Fig 17 - ProDigital Thermostat

Measured temperature precision	0.2°F
Operating temperature	32°F – 122°F (0°C - 50°C)
Setting temperature range	41°F - 99°F in 0.5°F increments (5°C - 37°C)
Regulation characteristics	Proportional Integral regulation (adjustable, see installation menu) Cycle: 15 minutes or Static differential 0.5°F Anti-short cycle: 3min in OFF, 2min in ON.
Electrical Protection	Class II - IP30
Power Supply	24 VAC +/- 10%
Output	TRIAC output 24 VAC, 15 W max. (4 CPS ProZone actuators Part #450014)
External Floor sensor	NTC (10K Ohms) 9ft

ProChronotherm (P/N 450011)

Pro Chronotherm thermostats contain an on-board clock to adjust temperature based on certain time of day.
The functions are similar to Pro Basic thermostats and come with on-board sensor.

Fig 18 - Pro Chronotherm Thermostat

Operating temperature	32°F – 122°F (0°C - 50°C)
Comfort / Reduction mode setting temperature range	41°F - 95°F (5°C – 35°C)
Daily clock programmable	24H with 15 minutes step
Weekly clock programmable	7 days with 1 hour step
Regulation characteristics	Proportional band 2°K for 10min cycle
Electrical Protection	Class II - IP30
Power Supply Battery operated life	2 x AA LR06 1.5V > 1 year (For Alkaline type)
Output	Relay output => 1RT Free contact (8(3)A 24Vac)

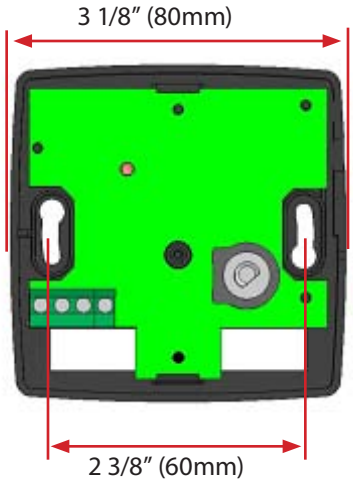
Thermostat Features Overview

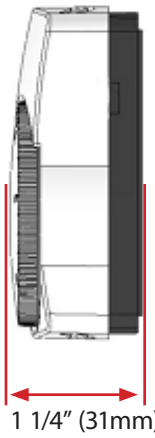
Features		Pro Basic	Pro Basic Dual Sensor	Pro Digital Dual Sensor	Pro Chronotherm
Part #		450008	450009	450010	450011
Sensor	On-Board	•	•	•	•
	External Probe (Sensor)		•	•	
Direct Drive (Actuator)	Triac ($24V_{AC}$)	•	•	•	•
	Relay				
Mode Selector	Day - Comfort			•	•
	Night - Reduction			•	•
	Duty Cycle				
Heating/ Cooling Control	Heating	•	•	•	•
	Cooling				
Clock Timer					•
Digital Display				•	
Proportional Adjustment (Hysteresis)			•	•	
Temperature Dial		•	•		
Digital Button Control				•	
Auxiliary Relay hockup (4 wire operation)					•

Table 3 - Pro Series Thermostat Features

Thermostat Dimensions

Pro Basic (P/N 450008)/ Dual Sensor (P/N 450009)

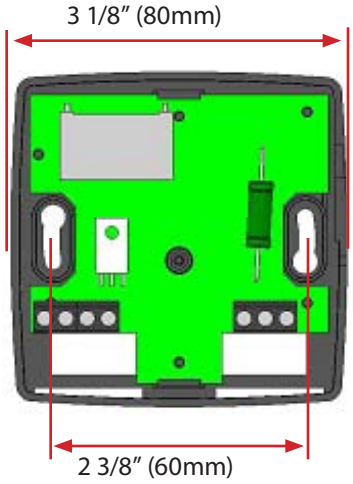


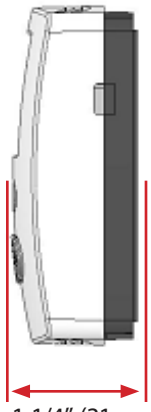


Installation Steps (see also product instructions in package)

1. Lift temperature dial from thermostat
2. Loosen visible screw to open thermostat body
3. Pull connection wiring through appropriate bottom hole (optional external sensor wiring as well)
4. Use appropriate wall screws to afix thermostat body at desired location.
5. Connect wiring according to connector ID in section "Thermostat Wiring"
6. Close thermostat cover by tightening screw
7. Push temperature dial on potentiometer half moon stub

Pro Digital Dual Sensor (P/N 450010)

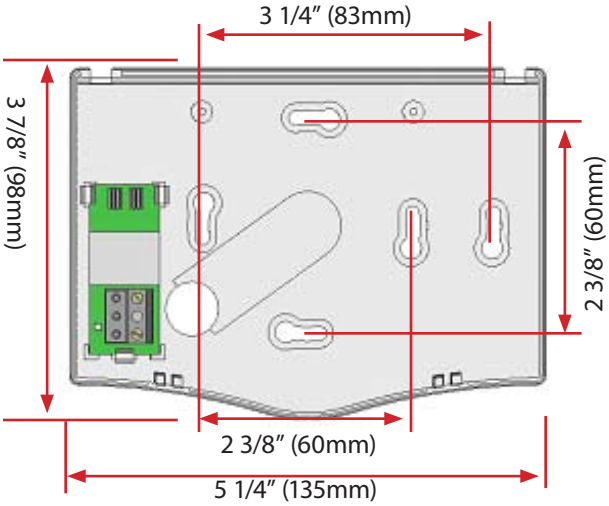


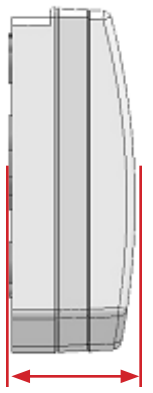


Installation Steps (see also product instructions in package)

1. Lift center rubber lid from thermostat
2. Loosen visible screw to open thermostat body
3. Pull connection wiring through appropriate bottom hole (optional external sensor wiring)
4. Use appropriate wall screws to afix thermostat body at desired location.
5. Connect wiring according to connector ID's in section "Thermostat Wiring"
6. Close thermostat cover by tightening cover screw
7. Push protective center rubber lid back onto opening

Pro Chronotherm (P/N450011)





Installation Steps (see also product instructions in package)

1. Open thermostat flip cover and remove battery compartment lid
2. Loosen visible screws (2x) to open thermostat body
3. Pull connection wiring through appropriate bottom hole (optional external sensor wiring)
4. Use appropriate wall screws to afix thermostat body at desired location.
5. Connect wiring according to connector ID's in section "Thermostat Wiring"
6. Close thermostat cover by tightening cover screw
7. Set batteries (right polarity) and close compartment cover

Thermostat Wiring

All AquaHeat ProZone Control System thermostats are wired via two or four cables. Two cables are required for supply power and signaling to the thermostat and two wires are for driving the actuator directly to the actuator or through the ProZone Box. For wiring of the thermostat the following AWG sizes are required:

Minimum AWG size 24 for thermostat signaling
Minimum AWG size 18 or lower for driving the actuators directly

For dual sensor thermostats the wiring is typically provided with the probe.

Connector #	Signal
1	Thermostat (24V)
2	Actuator (24V)
4	Grd
4	Grd

Table 4 - Pro Series Thermostat Wiring

Connecting Pro Basic Thermostats to the ProZone master/slave zone module

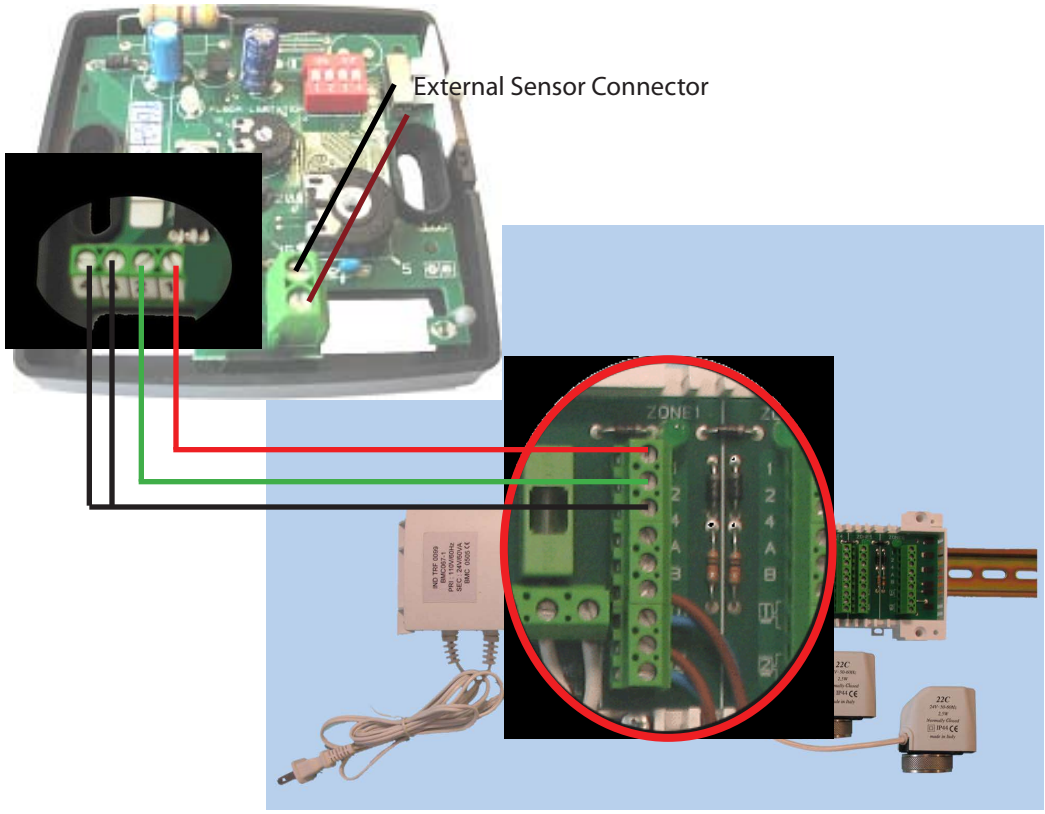


Fig 19 - Pro Basic Wiring

Connecting Pro Digital Thermostats to the ProZone master/slave zone module

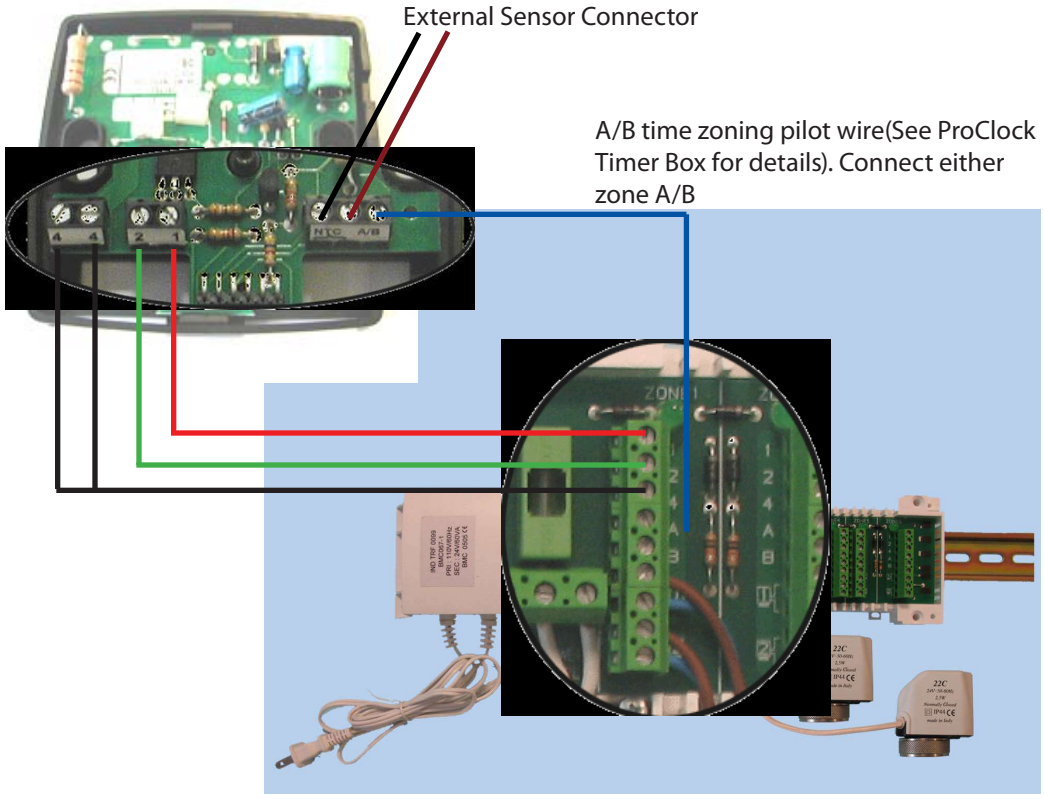


Fig 20 - Pro Digital Wiring

Connecting Pro Chronotherm Thermostats

Pro Chronotherm thermostats differ slightly from Pro Basic and Pro Digital thermostat. This lies in the application for Pro Chronotherm thermostats. These Stats are designed to give a timing feature into the application and thus allowing for a low cost alternative to ProZone Master/Timer combinations in. The Chronotherm thermostat can regulate a boiler supply in a static boiler loop.

The timer function allows to set individual timing schemes for the thermostat to work. During the time the thermostat is regulating the flow in the heating loop and thus manages the heat supplied to an area in which the thermostat is controlling.

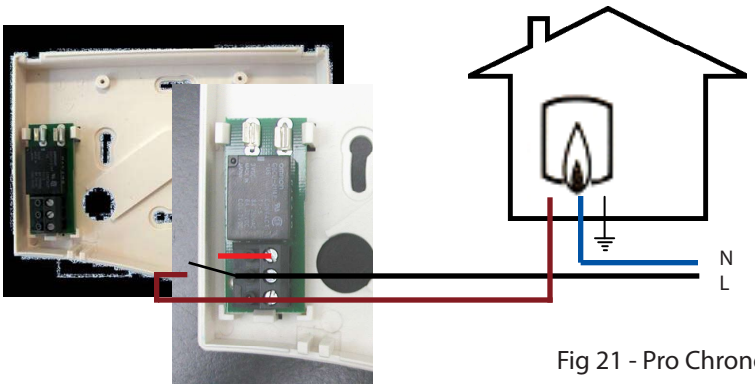


Fig 21 - Pro Chronotherm Wiring

Configuring Pro Series Thermostats for dual sensor applications

Dual sensor thermostats allow to regulate between two separate temperature measurements. For proper adjustment of room and floor temperature it might become necessary to deviate from the pre-configured thermostat settings.

AquaHeat ProBasic and ProDigital Dual Sensor thermostat both are configurable for either only internal, only external sensor or both, in which case the external (floor) sensor is used as a temperature limiter.

Pro Basic Configuration

Pro Basic Dual Sensor thermostats are configured by dip switches (configuration switch) located on the inside PC board and are best adjusted during the installation of the thermostat. Basic adjustments as the actuator type, regulation mode (static differential/proportional, and the sensor modes).

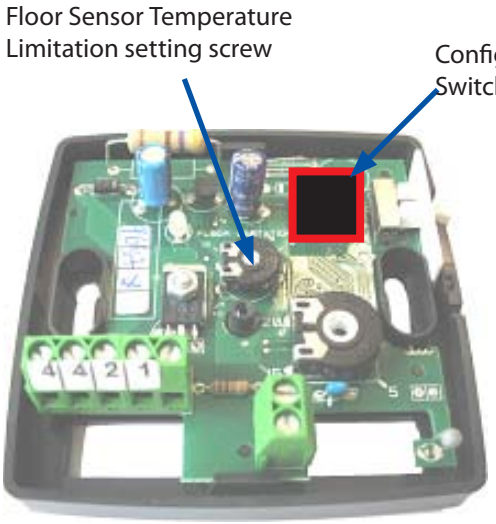


Fig 22 - Pro Basic Configuration

Configuration Switch Selection Pro Basic

1. Select the actuator type (Choose between 2 - wire and 4 - wire with end switch)

2. Select regulation method preferred

3. Select which sensors are to be used and whether the floor sensor should limit the measurement to the lower or higher temperature

Please see table below for available configurations

Configuration Switch		Switch Position			
State	Function	1	2	3	4
1	Actuator NC	down			
2	Actuator NO	up			
3	Static Differential Regulation		down		
4	Proportional Regulation		up		
5	Internal (Room) Sensor only			down	down
6	External (Floor) Sensor only			down	up
7	Both Sensors - floor lower limit			up	down
8	Both Sensors - floor upper limit			up	up

Table 5 - Pro Basic Configuration Dip Switch

Pro Digital Configuration

Pro Digital dual sensing thermostats offer a wide variety of user configurable options. For details we refer to the product specification sheet coming with the unit. To configure the ProDigital thermostat for multi sensor applications the setup menu needs to be entered.

1. Press "OK" button for 5+ seconds. The setup menu occurs
2. With the + or - keys navigate to menu J6 - Regulation Options
3. Press OK button again to set or edit the preset value until the choice starts blinking
4. Set the desired value by navigating the + or - buttons

The following values are available

Air => Regulation with room sensor only (Floor limitations is activated if floor sensor connected)
Flr => Regulation with Floor (external) sensor only.(Without Floor limitations)
AF => Regulation with 2 sensors (room & External sensors). (Without Floor limitations)

5. Confirm your selection by pressing the "OK" button
6. Exit the setup menu by navigating with + or - keys to the menu item "end". Pressing OK once more will exit the setup menu.

Note: Please refer to the Menu options table for further menu option parameters.

Menu Option	Value description
J0	°C / °F temperature display selection
J1	"Hot" / "Cold" regulation mode. Select Hot for a Heater system, select Cold for a Cooling system
Cy	Proportional Integral regulation time cycle value in minutes (default: 15 minutes cycle)
bp	Proportional Integral regulation band amplitude value in degrees °C/°F (default: 2.0°C/3.6°F)
J4	"NC" or "NO" Normally closed or normally open actuators selection
J5	Select "PMP" to perform an 1 minute exercise everyday (if installation inactive during a day)
J6	choice of sensor for the regulation : Air : Regulation with room sensor only (Floor limitations is activated if floor sensor connected) Flr : Regulation with Floor (external) sensor only.(Without Floor limitations) AF : Regulation with 2 sensors (room & External sensors). (Without Floor limitations)
J7	"rEG" (Proportional Integral) or "HYs" (0.3°K Hysteresis) regulation type selection
Cp	compensation value in °C/°F (default: 2.0°C/3.6°F) this parameter must be adjusted by a professional
Ao	Air sensor offset adjustment (default: no offset). Display measured Air sensor value
Fo	Floor sensor offset adjustment (default: no offset). Display measured Floor sensor value
FL	Floor temperature LOW limitation (default: 5°C/41°F), effective only if floor sensor present
FH	Floor temperature HIGH limitation (default: 28°C/82°F) , effective only if floor sensor present
Clr	Press OK key during 5s to reset all the CPS LCD parameters to factory defaults
End	Press OK key to exit installation parameter menu and return to normal operation

Table 6 - Pro Digital Configuration Menu

Connecting the ProZone Transformer

The ProZone transformer (part # 450014) comes with 120VAC on the primary side and transforms power to 24VAC on the secondary side. The total Power output is 60VA. As a separate box it is connected to either a 4 or a 6 ProZone Master control box. In small installations (up to 3 actuators) you might connect the transformer directly to the actuators and thermostats.

Fig 23 - ProZone Transformer

Technical Characteristics

Input Voltage	120VAC
Output Voltage	24VAC
Power output	60 VA

ProZone Transformer Limits

In a typical AquaHeat installation with Pro Zone control boxes and thermostats up to 18 AquaHeat Pro Zone actuators can be powered by a single Pro Zone Transformer. If more actuators are required for the control system either use two or more Pro Zone Transformers in parallel or you might select an equivalent transformer with higher output power.

Please note that any third party transformer used must cohere to the following requirements:

- Line (Input Voltage) 120VAC
- Load (Output Voltage) 24VAC
- Power Output 60 - 240 VA
- AC Frequency (output side) 60HZ
- Must be UL Class 2 or equivalent SA/CE/TUV approved not to void warranty

Installing External Sensors

Pro Series thermostats come with or without external sensor (probe) for measuring the exact slab temperature or floor temperature in addition to the room temperature. When installing a separate sensor it is important to maintain a minimum separation of 18" from parallel run powerlines. When crossing powerlines cross at a 90° angle.

Fig 24 - ProZone External Sensor

Technical Data	
Cable Length	9 ft
Electr. Resistance	NTC 10K ohm

Warning: If sensor and cable is installed < 18" distance to a power line signal distortions might lead to inaccurate readings.

Use only water-sealed sensors in in-slab installations since condensate can collect in the sensor's slab conduit and would otherwise corrode any unprotected sensor. A conduit is needed to install the sensor in concrete slabs. This could be a piece of pex pipe with a closed end cap. The wall side end of the conduit must extend out of the slab.

Caution: Make sure there are no kinks or squeezes in the pipe conduit which would prevent the sensor to reach the end of the conduit.

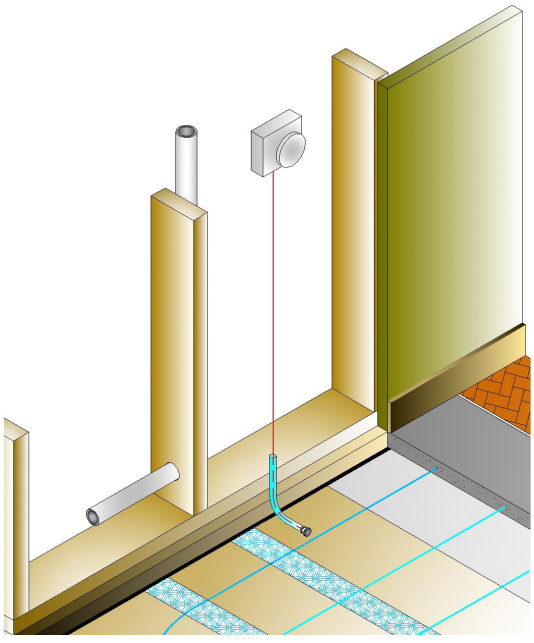


Fig 25 - External Sensor installed in concrete slab

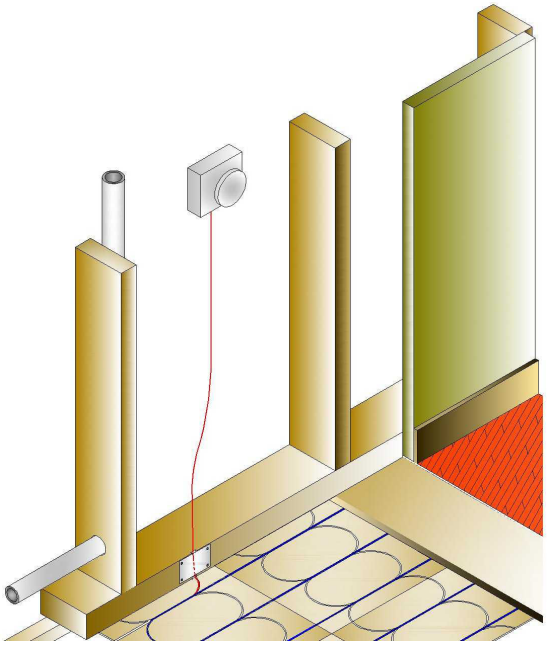


Fig 26 - External Sensor installed with Aqua-Heat Heat transfer panels

ComfortPro Systems LLC
Phone: 1-800-968-8905
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